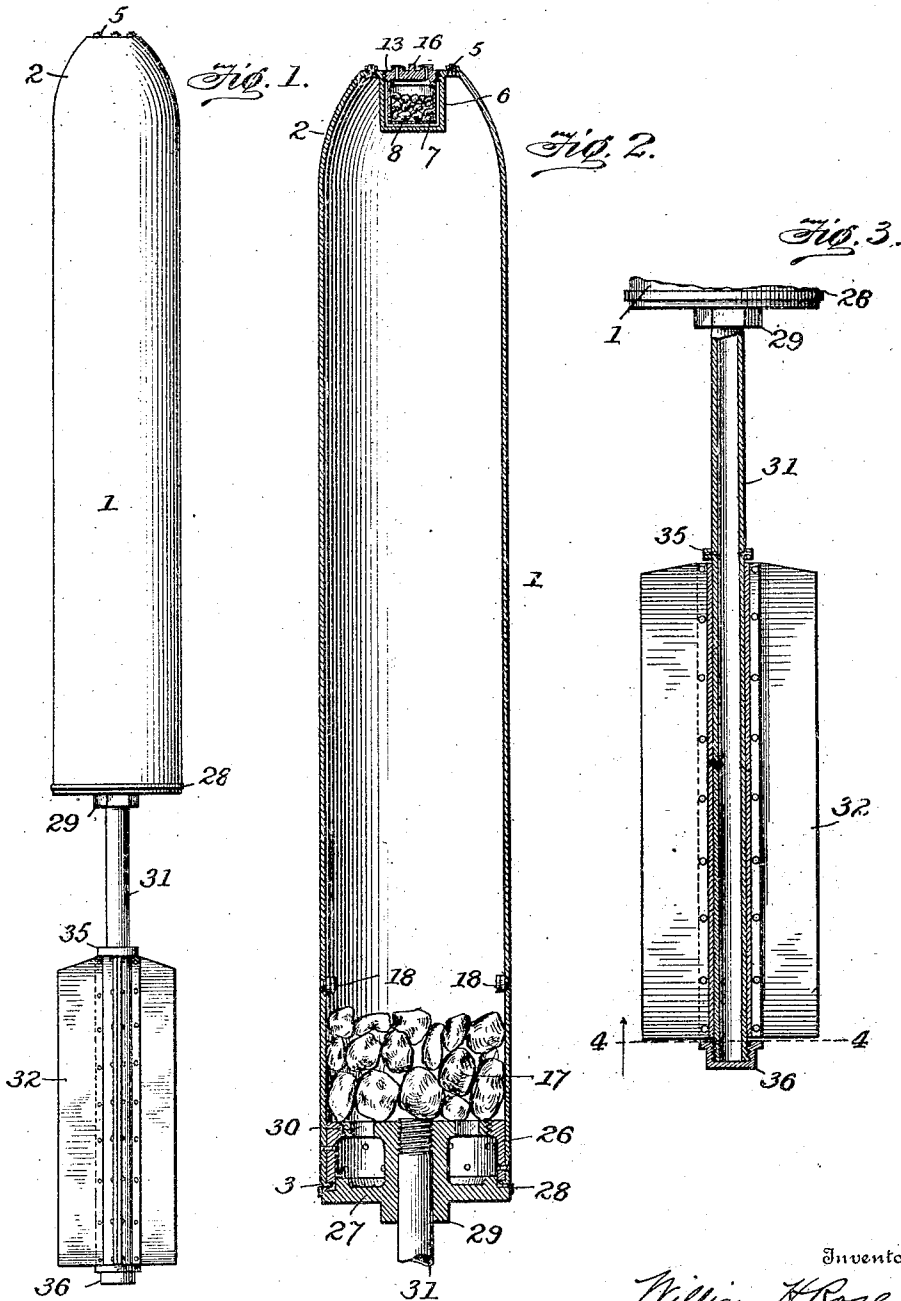


No. 825,419.

PATENTED JULY 10, 1906.

W. H. ROSE.
ILLUMINATING PROJECTILE.
APPLICATION FILED APR. 3, 1901.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 4.

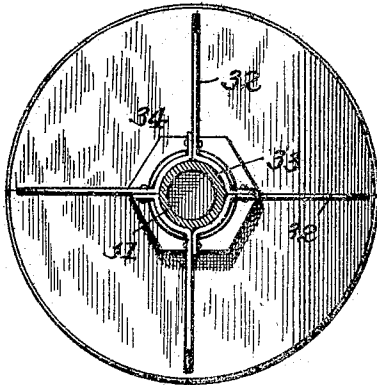


Fig. 5.

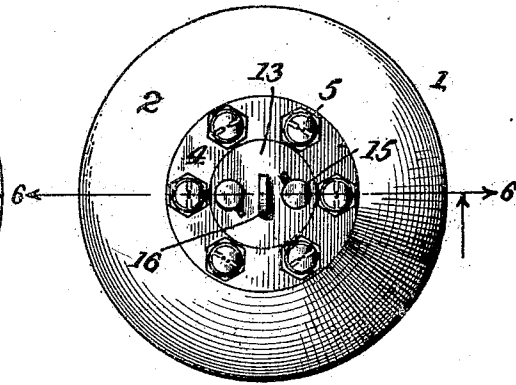


Fig. 6.

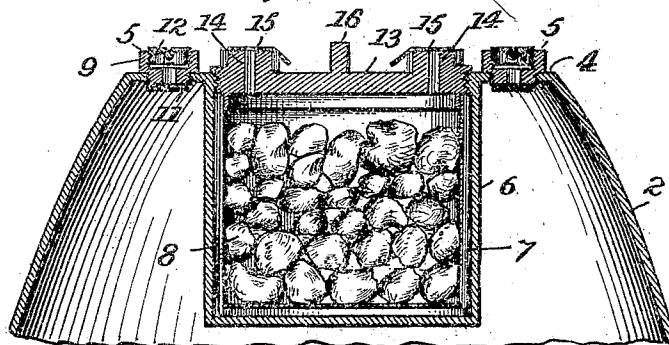


Fig. 8.

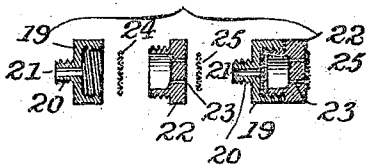
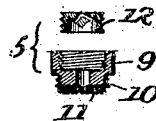


Fig. 7.



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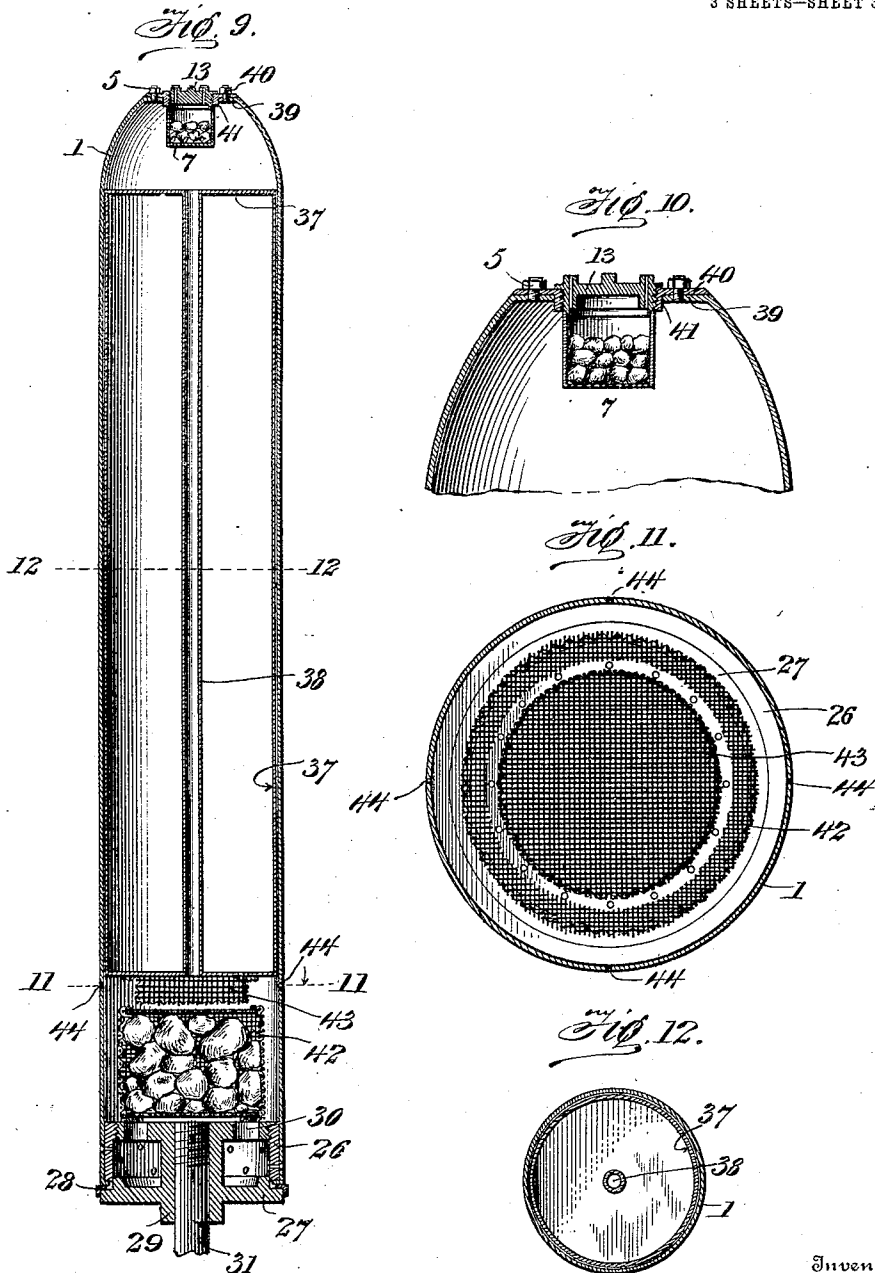
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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ILLUMINATING PROJECTILE.

No. 825,419.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed April 3, 1901. Serial No. 54,137.

To all whom it may concern:

Be it known that I, WILLIAM H. ROSE, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Illuminating Projectiles, of which the following is a specification.

This invention consists in an improved illuminating projectile adapted to be fired from a gun to a considerable distance and to float upon the water and produce a brilliant light for a considerable period after reaching its destination.

The projectile is provided with a charge of illuminating-gas or material for producing illuminating-gas and with means for automatically igniting the gas and reigniting it should it become accidentally extinguished.

The particular features constituting this invention will be specifically described in connection with the accompanying drawings, in which—

Figure 1 is a side view of a projectile embodying the invention. Fig. 2 is a central sectional view of the projectile proper. Fig. 3 is a central sectional view of the tail of the projectile. Fig. 4 is an end elevation, partly in section, on the line 4 4 of Fig. 3. Fig. 5 is a plan view of the forward end of the projectile. Fig. 6 is a section on the line 6 6 of Fig. 5. Fig. 7 is a detail of one of the burners. Fig. 8 is a detail of one of the water-inlets. Fig. 9 is a view similar to Fig. 2, illustrating a different form of the invention. Fig. 10 is an enlarged detail view of a portion of Fig. 9. Fig. 11 is a section on line 11 11 of Fig. 9. Fig. 12 is a section on line 12 12 of Fig. 9 on a reduced scale.

Referring to the drawings, the body 1 of the shell preferably consists of a steel tube of proper length drawn in to form a conoidal head 2 and having an inwardly-turned flange 3 at its base. As shown in Figs. 1 and 6, there is formed integral with the shell an annular platform 4, upon which the burners 5 are situated, and a central cup 6, within which the vessel 7 for the igniting material 8 is contained.

A plurality of burners is used, the preferred form being illustrated in Fig. 7, in which there is a metal body 9, having a threaded shank 10, which screws into the shell, and a wire-gauze protector 11, which prevents dirt from clogging the burners on the inside.

Within the threaded socket, on the upper side of the burners, fits a suitable tip 12.

As shown in Figs. 2 and 6, the igniting material 8, which preferably consists of lumps of phosphid of calcium, is contained in a vessel 7, of sheet metal, attached to a disk 13, having a threaded periphery which is screwed into the upper end of the cup 6 in the end of the shell. The disk or cover 13 is provided with one or more outlets 14, which are normally closed by seals 15, the seals being adapted to be torn off when it is desired to use the shell, as will be hereinafter described. The cover may also be provided with an angular projection 16 to enable the cup 7 to be readily removed and replaced by means of an ordinary wrench.

As illustrated in Fig. 2, the shell is charged with carbid. of calcium 17, loosely placed therein. In the side of the shell, and preferably above the carbid, are openings 18 to admit water. It has been found that when shells of this class have been stored for some time the dampness of the contained air will generate a small portion of acetylene gas, which mingles with the air, forming an explosive compound. In firing the projectiles the flame from the charge of powder will occasionally enter through these water-inlets if they are not properly constructed and explode the gas within, damaging the shell. To prevent the flame from entering, the inlets are preferably constructed as illustrated in Fig. 8. In said figure, 18 indicates the complete device. This is composed of a socketed receptacle 19, having a threaded shank projecting from its base, which is screwed into an opening in the side of the shell and through which extends a small opening or perforation 21. The interior of the receptacle is threaded to receive the threaded shank of an inner plug or cap 22, through which there are one or more small openings 23 out of register with the opening 21. Between the parts 19 and 22 is a screen 24 and on the inside of the part 22 is preferably placed a second screen 25, both for the purpose of preventing the carbid or other loose material within the shell from choking the inlet-openings. It has been found that the flame from the powder will not penetrate these small openings 21 23, and internal explosions are thereby prevented.

The base of the shell comprises a ring 26, fitting snugly within the shell and against

the flange 3, and a plug 27, which is screwed into the ring 26. The parts 26 27 clamp between them the flange 3 and a lead ring 28, having a projecting portion which forms a gas-check to prevent windage. The ring 26 is securely connected to the shell by suitable rivets or other fastenings. The plug 27 is detachable, being provided with a nut 29, by means of which it may be readily removed and replaced. The plug is preferably hollow to provide a light construction and is provided with openings 30 to permit the spent carbid to drain from the mass of carbid above.

The projectile is provided with a tail, preferably comprising a tube 31, screwed into a socket in the plug 27, and a series of vanes or wings 32. It has been found that these wings or vanes, if rigidly attached to the tail-stock 31, will become twisted or bent in the act of firing. This is presumed to be due either to the rapid rotation of the shell when fired from a rifled gun or to eddies in the gases produced, due to the rifling. This trouble is avoided by mounting the vanes 32 with freedom to turn on the stock 31. As shown in Figs. 1 and 4, the vanes 32 are united by circular portions 33, which partly encircle the tail-stock, the circular portion of each wing or vane having a flange 34, which is securely fastened to the adjacent wing. The parts 33 form a tube which fits loosely on the tail-stock and rotates freely thereon, being confined endwise between a collar 35 and a cap or nut 36. The cap 36 serves to hold the vanes on the stock and also to close the end of the stock, which is preferably a tube.

In Figs. 9, 10, 11, and 12 is illustrated another form of the invention differing in detail of construction from that above described. Referring to these figures, the shell 1 contains an inner air-tight chamber 37, preferably composed of light metal and provided with a central tube 38 to permit the gas to pass from the base of the shell to the burners. The shell terminates at the forward end in an annular flange 39. Upon this flange is a ring 40, having a depending inner flange 41. As shown, the flange 39 and the ring 40 are united by the shanks of the burners 5. The head 13 of the phosphid vessel is united to the flange 41 by a screw-joint. The vessel itself may be a light metal cup securely attached to this head. The head is provided with a nut and with normally sealed openings similar to those shown in the preceding figures. Within the lower end of the shell is a cartridge 42, consisting of carbid of calcium inclosed in wire-gauze or other open fabric. The base of the shell is substantially the same as that shown in Fig. 2. The carbid of calcium and phosphid of calcium may be permanently stored in the shell ready for use. In such case the water-

inlets 18 or 44, the burner-openings, and the openings to the phosphid vessel must be securely sealed from the atmosphere. This can be accomplished satisfactorily by inclosing the entire device in a sealed metal can or vessel. It is preferable, however, to arrange the shell so that it may be charged with the phosphid and carbid at or about the time it is to be used. The shells illustrated in the drawings are adapted to be thus charged and recharged, if desired, after having been once used. For instance, the shell shown in Figs. 1 and 2 may be charged with carbid by simply removing the plug 27 by means of a wrench and the attached nut 29, the plug being replaced after the proper amount of carbid of calcium has been placed within the shell. It is intended that the phosphid of calcium shall be furnished in cups 7 with screw-tops 13, the openings 14 being sealed, as shown at 15. To make the shell ready for use, a phosphid cup is connected by screwing it into the head of the shell and the seals 15 are removed.

In the form shown in Fig. 9 the phosphid is supplied to the shell as above described. The carbid is supplied in the form of a cartridge containing the proper amount for the charge. In this form the tube 38 is preferably guarded by a screen 43, which serves to hold the carbid cartridge in place. In this form of the invention the inner steel cup 6 and the inlet devices 18 of Fig. 2 are omitted and simple perforations 44 admit water.

The operation of the invention is as follows: The projectile is thrown from a gun with a moderate charge of powder, the amount depending upon the distance to which it is to be projected. As the shell plunges under the water the latter enters the phosphid-cup through the openings 14, the seals 15 having been removed. Phosphureted hydrogen is generated by the action of the water upon the phosphid of calcium, which gas issuing from the openings 14 takes fire as it reaches the atmosphere. The shell will float upright and the water will enter the inlets 18 or 44 and fall upon the carbid of calcium, thus generating acetylene gas. The gas will issue from the burners 5 and be ignited by the phosphureted hydrogen, the effect being a brilliant flame which will illuminate the water and adjacent objects brightly.

Having described the invention, what I claim, and desire to secure by Letters Patent, is—

1. An illuminating projectile comprising a cylindrical shell having burners and an automatic igniter at its forward end, a removable plug in its rear end, normally closing an opening through which a charge of carbid may be introduced into the shell, means for retaining the carbid at the rear end of the shell, closed float-chamber between said re-

taining means and the forward end of the shell and a conduit for conducting gas from the carbid to the burners.

2. The combination with a floatable shell 5 having burners and compartments for an igniter and for carbid of calcium, of devices for admitting water to the carbid of calcium, each comprising two parts having small perforations therethrough, the perforations in 10 said two parts being out of register.

3. In an illuminating projectile, the combination of a shell having burners, an igniter, and a compartment charged with carbid of calcium, of water-inlet devices, each comprising a socketed receptacle having a shank 15 fitting an opening in the shell, a plug fitting into said receptacle and a screen between said plug and the base of the receptacle, said receptacle and plug having perforations 20 therethrough which are out of register with each other.

4. In an illuminating projectile, the combination with the cylindrical shell, the burners, and the igniter, of a ring permanently 25 fixed within the base of the shell, a plug connected to the ring and forming a part of the shell, and a tail-piece comprising a shank attached to said plug and suitable wings on said shank.

5. In an illuminating projectile, the combination with the cylindrical shell, the burners, and the igniter, of a ring rigidly connected to the shell within the base thereof, a plug 30 screwing into said ring and closing the end of the shell, and a soft-metal ring or gasket closing the joint between said plug and ring and projecting to form a gas-check for the projectile.

6. In an illuminating projectile, the combination of the shell having the burners and the phosphid-compartment in its forward 40 end, and an inturned flange at its rear end, of a collar within the shell, a plug fitting into said collar to close the base of the shell, a

suitable winged tail connected to said plug, 45 and a soft-metal ring clamped between said flange and said plug, for the purpose set forth.

7. In an illuminating projectile, the combination with a shell, of a tail-stock rigidly 50 fixed to the shell and extending rearward therefrom in the axial line of said shell, and a series of wings arranged to freely rotate on said tail-stock.

8. In an illuminating projectile, the combination of a shell, a carbid-chamber within 55 the shell, burners at the upper end of the shell, a closed float-chamber between the carbid-chamber and the burners, having therein a conduit leading from the carbid-chamber to the upper end of the shell, and 60 means for admitting water to the carbid-chamber.

9. An illuminating projectile, comprising a shell, burners on the forward end of the 65 shell, a phosphid-igniter at the forward end of the shell, a charge of carbid near the rear end of the shell, and a closed float-chamber within the shell in advance of the charge of carbid and having a passage leading from 70 the carbid to the burners.

10. An illuminating projectile comprising a shell, burners on the forward end of the shell, a phosphid-igniter on the forward end 75 of the shell, a closed float-chamber within the shell having a gas-passage extending through it from end to end, a removable plug normally closing the rear end of the shell, and a charge of carbid of calcium confined within the shell between the plug and 80 said float-chamber.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. ROSE.

Witnesses:

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GEO. E. TERRY.